We claim:

1. A polymeric composition comprising a mixture of at least one polyalkylene glycol (PAG) or PAG-based macromer, and at least one PAG-interacting polymer (PIP), wherein the PIP interacts with the PAG to produce a mixture having a greater viscosity than either the PAG or PIP.

2. The composition of claim 1, wherein the PIP is selected from the group consisting of glycosaminoglycans, celluloses, dextrans, and polyvinylpyrrolidone, and their salts and derivatives.

3. The composition of claim 2 wherein the PIP is selected from the group consisting of hyaluronic acid, carboxymethyl cellulose, dextran, dextran sulfate, and polyvinylpyrrolidone.

4. The composition of claim 1, wherein the polyalkylene glycol or PAG-based macromer is selected from the group consisting of polyethylene glycol, copolymers of ethylene glycol with propylene glycol, and PAGs with crosslinkable groups.

5. The composition of claim 4, wherein the PAG-based macromer is a PAG with crosslinkable groups selected from the group consisting of acrylate, succinimidate, and isocyanate.

6. The composition of claim 1, wherein the PAG-based macromer contains biodegradable linkages.

7. The composition of claim 1, wherein the PIP is hyaluronic acid and the PAG-based macromer is a PAG with crosslinkable groups.

8. The composition of claim 1, wherein the composition contains between about 0.05% and about 20% by weight of the PIP, and between about 4% and about 30% by weight of the polyalkylene glycol or PAG-based macromer.

9. A method for forming a biocompatible, flexible, bioadhesive gel, comprising

(a) forming an aqueous solution comprising a polyalkylene glycol or PAG-based macromer and a PAG-interacting polymer, wherein the PAG interacts with the PAG to increase the viscosity of the polymer solution;

(b) applying the solution to the surface of a substrate, wherein the substrate is selected from the group consisting of cells, tissue surfaces and implants; and

(c) polymerizing the solution to form a gel.

10. The method of claim 9, wherein the solution contains between about 0.05% and about 20% by weight of the PIP, and between about 4% and about 30% by weight of the polyalkylene glycol or PAG-based macromer.

11. The method of claim 9, wherein the solution further comprises a bioactive substance.

12. The method of claim 8, wherein the PIP is selected from the group consisting of glycosaminoglycans, celluloses, dextrans, and polyvinylpyrrolidone, and their salts and derivatives.

13. The method of claim 12 wherein the PIP is selected from the group consisting of hyaluronic acid, carboxymethyl cellulose, dextran, and dextran sulfate.

14. The method of claim 9, wherein the polyalkylene glycol or PAG-based macromer is selected from the group consisting of polyethylene glycol, copolymers of ethylene glycol with propylene glycol, and a PAG with crosslinkable groups.

15. The method of claim 9, wherein the gel is used in an application selected from the group consisting of formation of tissue coatings and tissue sealants; delivery of therapeutic substances; lubrication; filling voids; replacement of vitreous fluid; adherence of tissue to tissue or to a medical device; coating of a medical device; embolization; encapsulation of cells, tissues and organs; immobilization of cells, tissue and organs; treatment of the retina; treatment of joints; prevention of adhesions; regeneration of a tissue; and encapsulation of medications.